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Mohamed Ali Ben Halima

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GATE Groupe d'Analyse et de Théorie Économique
UMR 5824 du CNRS
93 chemin des Mouilles – 69130 Écully – France
B.P. 167 – 69131 Écully Cedex
Tél. +33 (0)4 72 86 60 60 – Fax +33 (0)4 72 86 60 90
Messagerie électronique gate@gate.cnrs.fr
Serveur Web : www.gate.cnrs.fr

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*GATE (Groupe d'Analyse et de Théorie Economique),
UMR-CNRS n°5824, University of Lyon 2.
93, chemin des Mouilles - B.P.167 69131 - ECULLY cedex (France)
Phone +33(0) 472 86 60 37
Fax +33(0) 472 86 60 90

benhalima@gate.cnrs.fr

Abstract :

Two types of analyses intend to explain the determinants of labour contracts length. A first analysis emphasizes on the contracting costs and the level of uncertainty. The second analysis focuses on the incentive and selection effect of the contract length. This paper test the determinants for contract duration by means of econometric duration models. The estimates are carried out from French data called '*Trajectoires des Demandeurs d'Emploi*' (TDE), conducted by the Research Direction of Employment Ministry (DARES). An econometric treatment of the endogeneity of the labour contract status (indefinite-term contract (ITC), fixed-term contract (FTC), temporary contract (TC)) and unobservable heterogeneity is carried out. Our results show that wages positively affect employment duration. This confirms the positive effect of contracting costs reported. Moreover, staying in a firm more than tow years increases the length of the next contract.

Keywords : contract length, duration model, selection bias, unobservable heterogeneity

Classification JEL : J41, C41

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Introduction:

The recent period is characterized by an evolution of the working relationship in the industrialized countries. Indeed, many studies highlight an increase in the proportion of short-term contracts. There is a growth in these temporary forms of employment compared to longer contracts in France as well as in the other European countries.

The literature about contract duration can be classified in two distinct categories. A first type of analysis [Canzoneri (1980), Dye (1985) and Danziger (1988)] considers the duration of contracts from an external point of view. By external we mean that the temporary dimension of the employment relationship between an employer and one or more workers results from a search for a structure which can efficiently adapt to uncertainty affecting the external environment of the firm represented by real and monetary shocks. A second type of analysis [Harris and Holmström (1987), Jovanic (1979), Lazear (1979), Loh(1994) and Cantor (1990)] apprehends the duration of employment according to the internal environment of the firm. It is the search for performance in personnel management, selection of skilled workers, and control of the input of work which generates the duration of the relation between the employer and the employee. To do so, firms have to incite, control and organize these human resources by means of contract duration.

The early theoretical contributions emphasize that uncertainty and volatility are negatively related to contract length, whereas contracting costs positively affect duration. Gray (1978) argues that contract length should be positively related to transactions costs and inversely related to uncertainty, regardless of whether the uncertainty pertains to real or nominal shocks. These implications arise from two basic ingredients: a transaction-cost argument and an efficient-production argument. The former emphasizes that longer contracts lower the losses due to transaction costs. The latter stresses that shorter contracts reduce the expected losses due to inefficient production and employment. This is true because the expected losses increase with the deviation of the actual real wage from the real wage that would equate the demand and supply of labour, and such a deviation is greater for more distant periods as uncertainty rises over time. Dye (1985) builds a model which tries to overcome some of the limitations of Gray's approach, finding the same theoretical implications about uncertainty and contracting costs.

More recent models, however, stress that uncertainty and volatility may have a positive effect on contract length under some circumstances. Harris and Holmstrom (1987) find such a result using an "information-cost" argument. They develop a model where recontracting happens when the parties find it profitable to update their information and pay the associated cost. Contracts may increase their duration with a greater uncertainty since, with a noisier process, costly information is less valuable. Danziger (1988) develops an implicit contract model where workers are risk averse and firms are risk neutral. Within this framework, contracts allow for efficient-risk-sharing between parties and provide workers with a means of insuring against income fluctuations due to aggregate productivity shocks. As a consequence, greater real uncertainty causes workers to seek increased insurance through longer contracts.

Empirical works have examined the relationship between contract duration and nominal uncertainty distinguished by Gray rather than on the real type of uncertainty distinguished by Danziger.

Christofides and Wilton (1983) using data on Canadian contracts spanning the years 1966-1975, found truthfulness with Gray's hypothesis. Employing an alternative measure of nominal uncertainty based on the Livingston Index of Inflation Expectations, Vroman (1989) used a sample of contracts signed between 1958 and 1984 in the US manufacturing sector and also found that greater nominal uncertainty is associated with shorter contract length. The study of Wallace and Blanco (1991) is the one that contradicts the theoretical prediction and the empirical findings regarding uncertainty and contract length. Their data set consisted of labour contracts signed in the US manufacturing sector, dating from 1968 to 1980. They found that nominal uncertainty has a significantly negative effect on contract length in the non-durable goods sector, but that it has a positive, though not significant, effect on duration in durable goods manufacturing. When they aggregated sectors they found that nominal uncertainty does not have a significant effect on contract length. Murphy (2000) tests the Danziger hypothesis using a sample of 1876 labour contracts signed during the period 1977–1988. He uses variables measuring three types of uncertainty: the nominal uncertainty has a negative effect on contract length with elasticity is – 0.46, the real uncertainty has a positive effect with elasticity 0.17 (consistent with the theoretical prediction of Gray and of Danziger), and the relative uncertainty has a negative effect with elasticity is 1,42.

In the following analysis, we will limit ourselves to an internal analysis about personnel management: the role short-terms contracts can play in the policy of incentive and

control of employees. Studies in labour microeconomics based on game theory implicitly point out this principle again since they stress the importance of the temporary framework on the behaviours adopted by the agents and the results of game. In the same way, Lazear (1979) like Cantor (1988, 1990) proposed a dynamic approach of personnel management.

Cantor (1988, 1990) highlights a certain number of determinants of the optimal contract duration: this tends to decrease when the present preferential rate increases, or if the cost in term of utility associated with the same effort is higher. On the other hand this duration lengthens when the share of the quasi rent allocated to the employee increases.

In the next part, we will study shorter contracts as a probationary stage, in a context where optimal matching is not immediate and where dismissal costs dissuade firms to break contract relations. We will also point out how temporary contracts can be stepping stones to permanent employment.

Recent studies dispute the common view that fixed-term contracts actually offer firms increased flexibility due to restrictions that typically apply to the rolling over of these contracts (Hunt, 2000; Maurin, 2000).

However, firms have a number of reasons to use fixed-term contracts or temporary contracts. First, temporary workers may be preferred because they are less costly to employ. Second, fixed-term contracts, like other temporary contractual types, are preferred alternatives when temporary or temporarily vacant positions need to be filled. Third, in the case where there is uncertainty about the value of the match. The theory of the matching suggested by Jovanovic (1979), and prolonged by MacDonald (1982), constitutes the model of reference integrating this dimension of the labour market. According to these authors, it is necessary to install a mechanism making it possible to produce an optimal pairing in order to reach an efficient production. Firms view the initial fixed-term contracts as a probationary stage. Depending on the job performance and labour demand, workers will move into permanent employment within the firm. As pointed out by Loh (1994), Rosen (1994) and Lazear (1995) probationary periods may induce self-selection of those workers with higher ability because they have a higher probability to obtain permanent contracts. Temporary contracts with lower wages are therefore a sorting instrument for firms. Low wages during the temporary contract period will be compensated for by higher future wages at the same employer (Lazear, 1979).

The empirical works available for Italy (Adam and Canziani, 1998), France (Abowd et al., 1999), the United Kingdom (Booth et al., 2000), and Germany (Hagen, 2003) all indicate

that fixed-term contracts are stepping stones to permanent forms of employment rather than dead-end jobs. This is consistent with the hypothesis that fixed-term contracts are a mechanism of screening workers to permanent positions more than they are buffer-stocks or instruments of churning policies, which would rather lead to labour market segmentation.

Maxcy (2004) examines the choice of contracts of longer duration for workers with unique skills. Uncertainty, encountered by both worker and the firm, arises from two sources: variation in the market value of the worker's human capital and fluctuation in the worker's physical production. Maxcy's model shows that long-term employment contracts are a solution to the principal-agent problems: moral hazard and adverse selection of asymmetric information. The worker puts his/her informational advantage into practice over the firm in regard to his/her future level of productivity. In return, the firm provides the worker with income security with a contractually binding long-term relationship.

The structure of the article is organized as follows. In a first section we highlight the econometric problems encountered to test the micro-economic determinants of the duration of the contracts evoked in the introduction. In the second section, a descriptive analysis of the data of TDE " *Trajectoires des Demandeurs d'Emploi* " made up by the DARES and a nonparametric analysis of the duration of employment contracts by the method of Kaplan-Meir is carried out. The third section shows the econometric results from the estimate of the duration model with control for the endogeneity of the labour contract status and the unobservable heterogeneity. Finally, a synthesis of the main results is given as a conclusion.

1- The econometric model

The econometric evaluation of the determinants of the labour contract duration encounters a basic problem, ie the endogeneity of the labour contract status. Indeed, the employment duration on the labour market varies according to the contract status. Since the selection into longer or shorter contracts is not random, it is important to account for the selection mechanism in order to estimate the determinants of contract duration in an unbiased way and this was demonstrated through some empirical studies which investigate the endogeneity of the contractual status on the employment duration (Booth and Al, 2002b). Moreover, Hagen (2003) stresses that it is necessary to take the mechanism of selection into account to estimate unbiased effect of fixed-term contracts (FTC) on wages.

According to the econometric model, the duration of survival in employment has to be estimated with the various labour contract statuses. In the sample, the distribution of the

individuals between the different classes of employment contracts is not random but raises an endogenous selection mechanism. We propose a model representing three types of labour contract market:

1. ITC: Indefinite-Term Contract.

2. FTC: Fixed-Term Contract.

3. TC: Temporary Contract.

The issue of selecting individuals is made clearer if the individuals' specific characteristics determine the choice of the contract. We can suppose that some of these determinants also have an influence on the duration of survival in employment. The problem which we encounter is to isolate the real effect of the labour contract status. It is therefore necessary to determine the elements which influence the duration of the employment contract and we will adopt the method suggested by Heckman and Robb (1985) for that purpose. The advantage of this method is that it offers a very vast choice of duration models. However, if we adopted the Heckman's method (1979) [1], we would had to restrict ourselves to normal distribution.

Our approach initially consists in instrumenting the probability whether the individual has an indefinite-term contract (*ITC*) or a fixed-term contract (*FTC*), or a temporary contract (*TC*) by a multinomial logit model. If we suppose that each individual *i* has to choose between

the three choices $j = 1,2,3$. For the *i*th individual facing with *j* choices, suppose that the utility of choice j is

$Y_{ij}^{*} = X_i^{'}\beta_j + U_{ij}$ where $U_{i1},.....U_{im}$ are independent and identically distributed with Weibull distribution:

[1]Heckman's approach (1979) suggests introducing the Mill's ratio in a duration equation. In order to correctly estimate this approach, the residuals in both equations (selection and duration models) have to follow normal distribution, which restricts the approach for the duration model.

$$\begin{cases} F(u) = \exp(-\exp(-u)) \\ f(u) = F'(u) = e^{-u} F(u) \end{cases}$$

We assume that Y_{ij}^* is the maximum among the j utilities. Hence, the statistical model is driven by the probability that choice j is made, which is

$$Y_{ij}^* = \max\left(Y_{i1}^*, \ldots\ldots Y_{im}^*\right) \Leftrightarrow Y_{ij}^* > Y_{ik}^* \ \forall \ k \neq j \Leftrightarrow U_{ik} < -X_i'(\beta_k - \beta_j) + U_{ij} \forall \ k \neq j$$

The multinomial logit model estimated the probability for the j choice:

$$\Pr(Y_i = j) = \frac{\exp(x_i(\beta_j - \beta_0))}{\sum_{k=0}^{m} \exp(x_i(\beta_k - \beta_0))}$$

In order to ease the interpretation of the estimated parameters, we choose the temporary contract $(\beta_0 = 0)$ as the reference. Therefore the probabilities are:

$$\Pr(Y_i = j) = \frac{\exp(x_i \beta_j)}{1 + \sum_{k=1}^{m} \exp(x_i \beta_k)} \quad \text{for} \quad j = 1,2,3$$

The predicted probabilities are then integrated for final estimation in the parametric duration model in order to control for the endogeneity of the labour contract status.

The econometric model is introduced in the following way :

First step: selection model

$$P^*_{ij} = \alpha' Z_{ij} + \mu_{ij} \qquad (1)$$

$$j = ITC, FTC, TC \quad \text{and} \quad i = 1, \ldots\ldots\ldots\ldots, N$$

$$\text{where} \begin{cases} P_j = 1 \ \text{the individual has an indefinite - term contract (ITC)} \\ = 2 \ \text{the individual has a fixed - term contract (FTC)} \\ = 3 \ \text{the individual has a temporary contract (TC)} \end{cases}$$

Second step: duration model

$$DE_i = \beta' X_i + \sum_{j=1}^{3} \gamma_j P_{ij} + \varepsilon_i \quad (2)$$

We estimate DE_i, the employment duration, according to the individual characteristics X_i and the estimated probabilities for the labour contract status. The parametric estimation of the duration model under this specification makes it possible to obtain unbiased estimators.

2- Sample description and non-parametric results

We exploit data from a French survey called *Trajectoires des Demandeurs d'Emploi* (TDE), conducted by the Research Direction of Employment Ministry (DARES). It deals with people who became unemployed in 1995 and were interviewed each year until 1998.

This survey provides large information both on individual characteristics, type of labour contracts and employment duration. It covers Several labor-market areas: Cergy-Pontoise, Mantes and Poissy les Mureaux (Ile de France *region*), Roubaix and Lens (Nord *region*), Aix en Provence, l'Etang de Berre and Marseilles (PACA *region*). The sample includes 2289 individuals: 74% of individuals have returned to employment after a period of unemployment. The average unemployment duration is about 10 months.

Information on the length of new labour contracts after unemployment periods until the survey was completed concerns the types of contract and the size of firms of the new positions, the individual characteristics, the search strategies for the new labour contract, the causes for unemployment and the duration of the latest labour contract.

Among these people, 63% are less than 35 years old, 54% are men and over 90% of the individual are Europeans, of which a majority is French. The skill level of the individuals is classified in to four categories: 7% of the sample have primary education, 52% have technical qualification and 20% have a university degree. The information on individual characteristics (sex, age, skill level, marital status) can be used as a proxy to measure the effect of the contracting costs on labour contract duration.

Concerning the socio-professional category of the father, 50% are workmen and 10% are employees. For 82 % of the individuals, the duration of the last employment is under 5 years. Entry into unemployment was due to dismissal for 33% of cases, to contract termination for 49% of cases and to resignation for 13% of cases. These last variables, the causes of entry into unemployment and the duration of the last employment will be used to test the theoretical conclusions of Rosen (1994) and Lazear (1995) concerning the impact of the effort of employees over the contract duration and the signal theory (Spence, 1973).

Concerning the new employment, social and professional network (43%) and the market methods (31%) are the two main active search strategies. Over 40% of the individuals obtain a fixed-term contract (FTC), 22% find a temporary contract (TC) and only 32% succeed in obtaining an indefinite-term contract (ITC). The average duration of new employment is 6.55 months. For 73% of the individuals, monthly wages of the new employment including premiums are below 1000 Euros.

To supplement this descriptive analysis of the sample, we calculated some statistics of individual characteristics depending on the three types of labour contracts: sex, age, level of education, causes of entry into unemployment, and active search strategy for the new employment.

Table 1 : Labour contract status / sex

	ITC	***FTC***	***TC***
MEN	*63.93%*	*52.47%*	*41.98%*
WOMEN	*36.07%*	*47.53%*	*58.02%*
Total	*100%*	*100%*	*100%*

Men are more represented in both types of contracts: the indefinite-term contract (63%), the fixed-term contract (52%). Conversely, women are more likely to obtain temporary contracts (58%).

Table 2: Labour contract status of new employment / age classes:

	ITC	***FTC***	***TC***
CLASS1: [16 ; 25[	*18.94%*	*29.75%*	*25.13%*
CLASS2 : [25 ; 34[	*39.73%*	*38.50%*	*33.14%*
CLASS3 : [34 ; 50[	*37.28%*	*28.67%*	*37.84%*
CLASS3 : [50 ; + [	*4.05%*	*3.08%*	*3.89%*
Total	*100%*	*100%*	*100%*

Table 2 displays the distribution of contracts by age. 39% of the ITC and 38% of the FTC are held by individuals in the second class age (from 25 to 34 years). But, the third class age (from 34 to 50 years) is more concentrated in temporary contracts (37%).

Table 3: Labour contract status of new employment / causes of entry in to unemployment

	ITC	***FTC***	***TC***
Resignation	*46.21%*	*27.23%*	*22.37%*
Dismissal	*16.01%*	*11.72%*	*12.71%*
End of FTC	*31.41%*	*58.16%*	*60.77%*
Other causes	*6.37%*	*2.89%*	*4.15%*
Total	*100%*	*100%*	*100%*

Table 3 analyzes the reason for leaving past job crossed with the labour contracts of the new employment. 58% of the individuals with a fixed-term contract (FTC) had to end their employment due to fixed-term contracts. 46% of the individuals with an indefinite-term contract (ITC) were dismissed and 31% were granted an indefinite-term contract at the end of their fixed-term contracts. One can also notice that the precariousness of the last job (end of FTC) is the major cause (60%) to obtain a temporary contract, versus 22% of dismissed people and 12% of resigned people.

Table 4: Labour contract status of employment / search strategy

	ITC	***FTC***	***TC***
MARKET	*31.54%*	*32.73%*	*26.23%*
ALE	*9.29%*	*12.62%*	*30.45%*
SCHOOLS	*12.84%*	*13.27%*	*22.44%*
NETWORK	*46.33%*	*41.38%*	*20.88%*
Total	*100%*	*100%*	*100%*

Table 4 allows us to assess the main active search strategies of the new job. The social and professional networks (NETWORK) are most effective in the search for an ITC or FTC since 46% of the individuals with an ITC, and 41% of people with a FTC used this strategy. The market procedures (MARKET) such as spontaneous appliances to an employer or advertisements represent lower proportions compared to professional networks. The use of local public employment agencies (ALE) is in the first method used (30%) for temporary contracts. 22% of the individuals who obtained a temporary contract (TC) had recourse to

specialized schools. Lastly, this table shows that each status of labour contracts is characterized by a specific means of research.

We now proceed to a non-parametric estimation of individuals' employment duration. We estimate survival[2] rates in employment by means of Kaplan-Meier non-parametric estimator. Survival functions evaluated on stratified samples show discriminating effects of labour contracts in employment duration.

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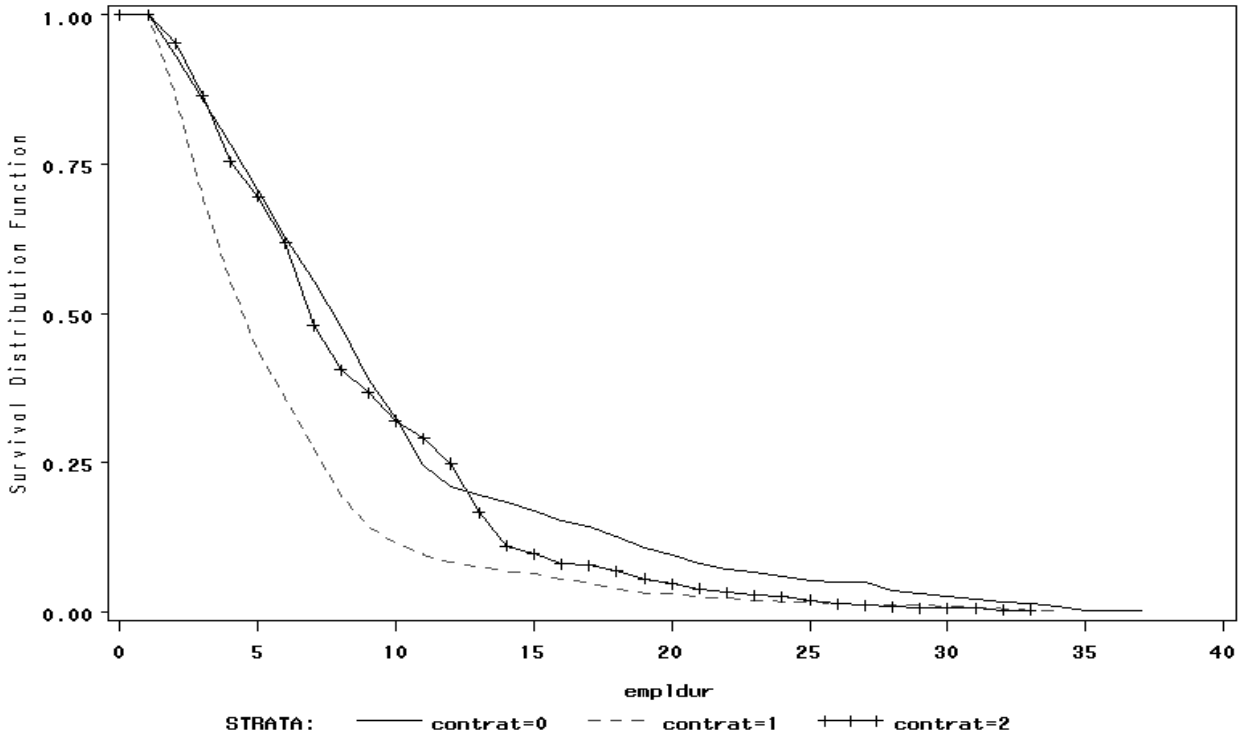
[2]The random variable T has a continuous probability distribution. The cumulative probability is $F(t) = P(T < t)$. It represents the probability that employment duration is at least t period. The survival function is: $S(t) = 1 - F(t) = P(T \geq t)$; $S(t)$ represents the probability that T is not over after t periods of time.

Graph 1: Survival Function by labour contracts status

(0 = ITC, 1 = FTC, 2 = TC)



The survival function is decreasing whatever the individuals' status of labour contract. One can compare survival in employment for the three types of contracts (ITC=0; FTC=1; TC=2). The function of survival of the individuals with a FTC is always below that of the individuals with an ITC. The probability of survival of the TC is sometimes higher than that of the ITC until the 12th month. But afterwards, ITCs survive longer in employment than temporary contracts. This can be explained by the fact that ITCs contain a probationary period in the first year to test the individual's skills, which is not the case for individuals with temporary contracts.

These estimates are however undertaken by the assumption of a homogeneous population and must be accompanied with an analysis of the durations of the various labour contracts taking the heterogeneity between the individuals into account. For this purpose, a parametric estimate of a duration model controlling for the endogeneity of the labour contract status is carried out.

3-Parametric estimation results:

3-1- Multinomial logit estimation of labour contract status:

In this section, the determinants of the labour contract status (ITC, FTC, TC) are analysed by the estimation of the logit multinomial model (see appendix 2). This corresponds to the estimation of the sample selection of our model. The results obtained in a sample selection equation confirms what was observed by the descriptive statistics.

The fixed-term contract (FTC) concerns especially workers aged 16-34, relative to the base of individuals over 50 years old. Since the majority of young people have no professional experience on the labour market, they accept even precarious working conditions. This result is confirmed by Booth, Francesconi and Frank (2002a) on English data. However, it is noticed that workers aged 34-50 are granted indefinite-term contracts (ITC).

Lazear and Rosen (1990), Dolado and al (2002), and Booth and al. (2002a) show that women more often hold temporary contracts. This result confirms that being a man has a positive and significant probability of getting an ITC. The chances of having an established position under indefinite contract duration are higher for Europeans than for non-European people.

The results show that workers with low human capital (primary education, general education and techniques) hold more temporary contracts than the workers with university degree. People who undertook university studies have a higher probability to obtain indefinite contract duration.

We use the occupation of the individuals' father as a proxy for permanent income. Social origin variables indicate that children of executive or intermediary professions have a higher probability of holding indefinite-term contracts relative to children of workmen. On the other hand, children of farmers hold fixed-term contracts whereas temporary contracts meet more success with children of workmen.

Relative to resignation, individuals entering unemployment at the end of their FTC have a lower probability to obtain an ITC than dismissed individuals and those who left their last employment for others causes (such as end of the probationary period or end of military service). This result highlights the significance of the status when recruiting and selecting on the labour market. These results are consistent with Waldman's hypothesis (1990) in an "up-or-out contract" environment and Spence's signal theory (1973) on the labour market. If

employers are uncertain about the unobservable characteristics of employees like ability or motivation, the individuals employment history may serve as a signal. References from previous employers and the causes of entry in unemployment may include information on the unobservable characteristics of workers. If the previous employment history involves bad signals and there are no alternative applicants available, the employer will hire the worker on a shorter contract.

Examining the significance of the search strategy for employment enables us to classify a grid of research for each type of labour contract. Indeed, using market methods (reference: schools) increases the probability of getting an ITC or FTC. The probability of holding a fixed-term contract is greater when individuals use a local employment agency as well as the market method for search in new employment. This result is in agreement with those obtained on the same data by Cavaco, Lesueur and Sabatier (2002).

Individuals with unemployment benefit are more likely to reach fixed-term contracts or temporary contracts than indefinite-term contracts.

The introduction of regional specific effects shows that individuals in the job area of CERGY, MANTES and POISSY have a positive and significant probability to obtain an ITC compared to those in the areas of AIX and MARSEILLE. On the contrary, individuals in ROUBAIX are more likely to get a FTC.

The local rate of unemployment tends to increase the probability of precarious employment (FTC-TC). Persistence of unemployment obviously makes the recourse to this type of employment much more frequent.

3-2- Analysis of the results of parametric estimation:

In this section, various parametric estimates were carried out while controlling the endogeneity of labour contract statuses (see Appendix 3). In order to compare the various specifications (Weibull, Log normal, Log logistic), the Akaike information criterion is used. It is the model minimizing the function of the information criteria which is chosen, ie the Weibull distribution model. The hazard rate of leaving employment is thus monotonous. In order to reinforce the robustness of the econometric estimate of the Weibull specification, we estimated this duration model by introducing a correction for unobserved heterogeneity by the Gamma distribution (Lancaster, 1990).

More precisely, a treatment of unobserved heterogeneity is carried out through the individual specific effect v which induces the modification of the hazard rate:

$$\lambda(X, t/v) = v\lambda(t, X).$$

We assume that *v* has a gamma distribution with mean 1 and variance $\sigma^2 = 1/k$ then:

$$f(v) = \frac{k}{\Gamma(k)}\ e^{-kv}\ v^{k-1} \quad \text{where } \Gamma(k) = \int_0^{\infty} x^{k-1}\ e^{-x}\ dx$$

In the next part, we will interpret the results relative to this distribution duration in appendix 3. The significant character of the associated coefficient of heterogeneity (theta) indicates the relevance of the use of the Weibull model with correction of the unobservable individual effects.

The respective coefficients of variables *PITC, PFTC, PTC* indicate the predicted probability value for an indefinite-term contract, fixed-term contract and temporary contract. These variables control the endogeneity of the labour contract status over employment duration. The coefficients of *PITC, PFTC,* and *PTC* are very significant. Indeed, it is noticed that individuals under an ITC or a FTC have employment duration significantly longer than those under a temporary contract. Therefore, individuals under an ITC or a FTC improve their chances of stabilization in an employment position compared to people with other contractual statuses.

Concerning the age of individuals, compared to individuals in the first age class (16-25 years), individuals in the second and the third classes have significantly longer employment periods.

The introduction of interacted variables (*status of contracts* × *Female*) enables us to conclude that the fact of being a woman under a ITC or a FTC reduces the employment duration, although being under these contracts has a significant and positive effect over the employment duration. That confirms the effect of discrimination according to gender evoked by Booth et al. (2002a) and Lazear and Rosen (1990).

The individual employment history seems to be very important. Individuals with the latest employment duration (from 2 to 5 years) and a long duration (from 5 years and +) have a significant and positive effect over the duration of new employment than people with a latest employment of shorter duration (from 0 to 2 years). This result is in conformity with those of the Spence (1973), Looh (1994), Rosen (1994) and Lazear (1995) theory. The employment history may also capture characteristics like ability or motivation which cannot

be observed. A further explanation suggests that employers hesitate to hire workers with an unstable labour market history under indefinite contract duration.

Employment duration varies according the size of firms. Compared to firms employing over 200 employees, workers in firms with 49 to 200 employees have longer employment spells.

The introduction of the wage variable into the duration equation confronts us with a possible problem of endogeneity. For this reason, the difference in actual wages and predicted wages resulting from the estimate of Mincer equation of (1974)[3] has to be introduced. The individuals having a wage belonging to the third and fourth quartile have longer employment spell than those of the first quartile. That confirms the positive effect of the contracting costs evoked by Gray and Canzoneri over the contract length.

Location in the CERGY, MANTES POSSY, and ROUBAIX labor-market employment areas has a negative and significant effect over employment duration compared to AIX and MARSEILLES. This can be due to the fact that these areas are characterized by more uncertainty on the job supply.

[3]The results of the estimate of the equation of wages are presented in appendix 4. This method consists in introducing the estimated residual (real wages - predicted wages) of the duration equation in order to detect the endogeneity of wages. The non-significativity of the coefficient allows us to deduce that there is no correlation between the residue of wages and employment duration.

Conclusion:

The microeconomic analysis of contract lengths proposed in this article highlights several stylized facts. On the one hand, the analyses of Gray (1978), Canzoneri (1980), and Danziger (1988) argues that contract length should be positively related to transactions costs and inversely related to uncertainty, regardless of whether the uncertainty pertains to real or nominal shocks. The second analysis of contract length as an internal mechanism of personal management shows the influence of time-limited contracts on the incentive with the effort, and the selection of the skilled workers.

The contract length has to be estimated with the various labour contract statuses. In the sample, the distribution of the individuals between the different classes of employment contracts is not random but raises from an endogenous selection mechanism. The estimates were carried out starting from French data called '*Trajectoires des Demandeurs d'Emploi*' (TDE), conducted by the Research Direction of Employment Ministry (DARES). An econometric treatment of the endogeneity of the labour contract status (indefinite-term contract (ITC), fixed-term contract (FTC), temporary contract (TC)) by Heckman and Robb (1985) method and unobservable heterogeneity (Lancaster, 1990) was carried out.

The results of the estimate of a duration model by introducing a correction of unobserved heterogeneity by the Gamma distribution conclude that there is an endogeneity of the labour contract status. Besides, employment duration is all the more large as wages are high. This confirms the positive effect of the contracting costs evoked by Gray and Canzoneri over the contract length. Moreover, the fact of having a latest labour contract of over two years of time can explain the increase in the duration of the recent contract, which is close to the theoretical results of the Rosen and Lazear models.

Appendix 1 : Descriptive statistic

List of variable	*Means*	*Observations*
Age		
CLASSE1 : [16 ; 25[	**25.1**	**2289**
CLASSE2 : [25 ; 34[	**38.0**	**2289**
CLASSE2 : [34 ; 50 [	**33.2**	**2289**
CLASSE2 : [50 ; +[	**3.7**	**2289**
Female	**45.1**	**2289**
Nationalité		
EUROP : *european*	**94.3**	**2289**
NOEUR : *not european*	**5.7**	**2289**
Skill Level		
ETPRI : *primary education*	**7.4**	**2289**
CYEG : *general education.*	**20.5**	**2289**
ENTC : *technical education*	**52.1**	**2289**
ENSUP : *university degree*	**20.0**	**2289**
Socio professional category of father :		
AGRIP *: agricultural*	**2.1**	**2289**
TRINP : *independent worker*	**9.2**	**2289**
CPPLP *: executive or professional*	**9.5**	**2289**
PIITP *: intermediary profession*	**14.6**	**2289**
EMPYP : *employee*	**10.6**	**2289**
OUVRP : *workman*	**53.2**	**2289**
INACP : *non participant*	**0.1**	**2289**
Reason of leaving previous occupation:		
LICEN : *dismissal*	**33.2**	**2289**
DEMIS : *resignation*	**13.4**	**2289**
PRECA : *end of contract*	**49.0**	**2289**
OTHER	**4.4**	**2289**
Search strategy of new employment :		
RESEAU : *social and professional network*	**43.0**	**2289**
PROMAR : *market, spontaneous appliances*	**31.6**	**2289**
INTPUB : *ALE*	**12.3**	**2289**
ECOCON : *schools ,examinations*	**13.1**	**2289**
INDEMCHO : *unemployment benefits*	**58.0**	**2289**
Labour contract status of new employment:		
FTC : *fixed-term contract*	**44.8**	**2289**
ITC : *indefinite-term contract*	**32.3**	**2289**
TC : *temporary contract*	**22.9**	**2289**
Size firms:		
T1 : [0 ; 49 [	**60.8**	**2289**
T2 : [49 ; 99 [	**10.7**	**2289**
T3 : [99 ; 200 [	**7.5**	**2289**
T4 : [200 ; + [	**21.0**	**2289**

Duration of latest employment (years)		
DURCTE : [0 ; 2[	**69.28**	**2289**
DURMOY : [2 ; 5[	**17.76**	**2289**
DURLONG : [5 ; +[	**12.96**	**2289**
Job areas :		
CERGY	**13.3**	**2289**
MANTES	**10.3**	**2289**
POSSY	**12.8**	**2289**
ROUBAIX	**15.5**	**2289**
LENS	**15.8**	**2289**
AIX	**9.1**	**2289**
ETANG	**6.8**	**2289**
MARSEILLE	**16.4**	**2289**
Continues variables :		
EMPLDUR : Duration of new employment in months	**6.37**	**2289**
AGE : individual age	**31.66**	**2289**
ANNEES ETUDES : Number of education years	**13.45**	**2289**
SALMEN : Monthly wage of new employment in Euro	**1115.512**	**2289**
TXCHOM : rate of unemployment	**13.44**	**2289**

Appendix 2 : Estimation results of Multinomial Logit

	ITC		***FTC***	
Variable	***coefficient***	**T-student**	***coefficient***	**T-student**
CLASSE1 : [16 ; 25[	0.528	0.962	0.906***	3.661
CLASSE2 : [25 ; 34[	0.826***	3.436	0.815***	3.536
CLASSE2 : [34 ; 50 [	0.561**	2.302	0.472	1.017
CLASSE2 : [50 ; +[	Base	Base	Base	Base
MEN	0.859***	6.295	0.514***	4.046
FEMME	Base	Base	Base	Base
EUROP : *european*	Base	Base	Base	Base
NOEUR : *not european*	-0.426*	1.665	-0.253	-0.997
Skill Level				
ETPRI : *primary education*	-0.611**	-2.061	-0.580**	-2.104
CYEG : *general education.*	-0.580***	-2.643	-0.613***	-2.961
ENTC : *technical education*	-0.479**	-2.447	-0.525***	-2.841
ENSUP : *university degree*	Base	Base	Base	Base
Socio professional category of father :				
AGRIP *: agricultural*	0.017	0.035	0.264*	1.668
TRINP : *independent worker*	0.179	0.765	-0.109	-0.476
CPPLP *: executive or professional*	0.721***	2.691	0.440	1.541
PIITP *: intermediary profession*	0.350*	1.656	0.279	1.405
EMPYP : *employee*	-0.214	-0.968	-0.069	0.198
OUVRP : *workman*	Base	Base	Base	Base
INACP : *non participant*	0.278	1.205	0.047	0.089
Reason of leaving previous occupation:				
LICEN : *dismissal*	0.617***	2.991	-0.051	-0.537
DEMIS : *resignation*	Base	Base	Base	Base
PRECA : *end of contract*	-0.545***	-2.875	0.173***	2.801
OTHER	0.611**	1.753	-0.006	-0.961
Search strategy of new employment :				
RESEAU : *social and professional network*	0.509***	2.656	0.339***	4.735
PROMAR : *market, spontaneous appliances*	0.191	0.988	0.382***	3.524
INTPUB : *ALE*	-0.395*	-1.672	0.335***	3.421
ECOCON : *schools ,examinations*	Base	Base	Base	Base
Job areas :				
CERGY	0.648***	2.724	0.507**	2.166
MANTES	0.448*	1.753	0.576**	2.361
POSSY	0.614**	2.527	0.638***	2.697
ROUBAIX	-0.047	-0.211	0.639***	3.175
LENS	-0.819***	-3.815	-0.078	-0.414
AIX / MARSEILLE	Base	Base	Base	Base
ETANG	-0.225	-0.851	-0.012	-0.005
INDEMCHO : *unemployment benefits*	-0.096	-1.373	0.396**	1.673
TXCHOM : *unemployment rate*	-0.035**	-2.454	0.012*	1.678
Correct Prediction	68.84%		74.25%	
Pseudo-R^2	0.45			
Log Likelihood	-2311.532			
Number of observations	2289			

(***) significant at 1%, (**) significant at de 5%, (*) significant at 10%

Appendix 3 : Estimation results of the Weibull duration model with Gamma correction

Variable	***coefficient***	***T - Student***
One	1.571	8.181***
PITC : probability of ITC	1.701	16.416***
PFTC : probability of FTC	2.439	20.061***
PTC : probability of TC	Base	Base
CLASSE1 : [16 ; 25[	Base	Base
CLASSE2 : [25 ; 34[	0.121	3.344***
CLASSE3 : [34 ; 50 [	0.162	4.020***
CLASSE4 : [50 ; + [	0.047	0.698
MEN	Base	Base
FEMME	-0.144	-5.202***
PCDI * FEMME	-1.108	-3.611***
PCDD * FEMME	-1.503	-3.955***
EUROP : *european*	-0.043	-0.844
NOEUR : *not european*	Base	Base
ETPRI : *primary education*	Base	Base
CYEG : *general education.*	0.216	4.080***
ENTC : *technical education*	0.217	6.953***
ENSUP : *university degree*	0.217	6.967***
Duration of latest employment (years)		
DURCTE : [0 ; 2[	Base	Base
DURMOY : [2 ; 5[	0.127	3.927***
DURLONG : [5 ; +[	0.155	4.069***
Size firms:		
T1 : [0 ; 49 [	0.085	2.562**
T2 : [49 ; 99 [	0.129	2.718***
T3 : [99 ; 200 [	0.137	2.552**
T4 : [200 ; + [	Base	Base
Monthly wage of new employment :		
First quartile [591, 3900[	Base	Base
Second quartile [3900, 7000[	0.036	0.985
Third quartile [7000, 33600[	0.126	3.446***
Fourth quartile [33600, 56000]	0.198	5.077***
Job areas		
CERGY	-0.076	-1.911**
MANTES	-0.157	-3.591***
POSSY	-0.141	-3.370***
ROUBAIX	-0.300	-6.631***
LENS	-0.030	-0.688
AIX / MARSEILLE	Base	Base
ETANG	-0.01	-0.303
Sigma	0.274	17.943***
Thêta	1.653	9.619***
Log Likelihood	-3453.545	
Number of observations	2289	

(***) significant at 1%, (**) significant at de 5%, (*) significant at 10%

Appendix 4 : Estimate of Mincer equation (MCO)

In order to determine the earning of education, Mincer (1974) estimates a wage equation :

$$\ln(Y_i) = c + a_1 AGE + a_2 AGE^2 + r_1 S + r_2 S^2 + dX + u$$

with Y_i, the individual income,

AGE, AGE^2, age and squared age of individuals,

S, number of years of education. A quadratic form is introduced to represent the concavity of earning education due to investment in human capital.

Thus, $\frac{\partial \ln(Y_i)}{\partial S} = r_1 + 2r_2 S$ corresponds to the marginal earning rate of education in which r_2 is supposedly negative, showing decreasing marginal earnings,

X, a vector of individual and parental characteristics,

c, the constant term which is interpreted as the basic wage without human capital,

and u is a stochastic term of mean 0, representing the unobserved factors affecting wages.

Variable	***coefficient***	***T - Student***
One	-1.023	-6.251***
AGE	0.238	19.420***
$(AGE)^2$	-0.003	-17.360***
EDUCATION YEARS	0.507	17.039***
$(EDUCATION\ YEARS)^2$	-0.015	-14.455***
EUROP : *european*	Base	Base
NOEUR : *not european*	-0.089	-1.827**
Married	0.025	1.122
ETPRI : *primary education*	Base	Base
CYEG : *general education.*	0.217	2.774***
ENTC : *technical education*	-2.013	-0.257
ENSUP : *university degree*	0.146	1.845**
Socio professional category of father :		
AGRIP *: agricultural*	0.241	2.131***
TRINP : *independent worker*	-0.106	-1.812**
CPPLP *: executive or professional*	0.189	3.085***
PIITP *: intermediary profession*	-0.002	-0.056
EMPYP : *employee*	-0.058	-1.035
OUVRP : *workman*	Base	Base
INACP : *non participant*	-0.038	-1.286
R^2 corrected (Adjusted)	58.62	
Log Likelihood	-2371.34	
Number of observations	2289	

(***) significant at 1%, (**) significant at de 5%, (*) significant at 10%

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